ture of 65° and 3,000°. Let us be careful not to confound this increase of emissive power with the increase of radiant energy resulting from mere augmentation of temperature. It is, no doubt, owing to the change of the molecular constitution of the body during heating that the dynamic energy developed at a differential temperature of 3,000° is 4·21 times greater than it should be in accordance with the Newtonian law—a trifling increase, however, compared with that resulting from adopting the computations of Dulong and Petit, whose formula shows that for the stated range of temperature the ratio of radiant energy will be increased more than 4,000 times. It would be premature to attempt to explain the cause of the change of the radiant properties of metals at different temperatures disclosed by our experiments, until further investigations shall have established the exact relation between the actual and theoretical energy developed. Considering the difference of molecular motion within metallic bodies at white heat in a state of fusion, and at the freezing point of water, we need not be surprised at the variation of emissive power observed during our experimental investigation. Nor are we justified, in view of this variation of emissive power, in questioning the correctness of Sir Isaac Newton's assumption that heated bodies of definite radiant properties develop mechanical energies proportional to their excess of temperature over the surrounding media.

Temperature of the radiating sphere.	Temperature of enclosure.	Differential Temperature.	Observed Time.	Corrected Time.	Increment of time for each degree.
Fah.	Fah.	Fah.	Seconds.	Seconds.	Seconds.
133°	33°	100°	19·5	19·50	19·50
132	33	99	39	39·19	19·69
131	33	98	58	59·08	19·89
130	33	97	77	79·18	20·10
129	33	96	97	99·49	20·31
128	33	95	117	120·01	20·52
127	33	94	138	140·75	20·74
126	33	93	158	161·71	20·96
125	33	92	179	182·90	21·19
124	33	91	200	204·32	21·42
123	33	90	222	225·98	21·66
122	33	89	244	247·89	21·91
121	33	88	266	270·04	22·16
120	33	87	288	292·45	22·41
119	33	86	311	315·12	22·67
118	33	85	333	338·06	22·94
117	33	84	356	361·27	23·21
116	33	83	379	384·76	23·49
115	33	82	402	408·54	23·78
114	33	81	425	432·61	24·07
113	33	80	448	456·98	24·37
112	33	79	471	481·66	24·68
111	33	78	495	506·66	25·00
110	33	77	520	531·99	25·33
109	33	76	545	557·65	25·66
108	33	75	571	583·65	26·00
107	33	74	597	610·00	26·35
106	33	73	624	636·71	26·71
105	33	72	651	663·79	27·08
104	33	71	679	691·25	27·46
103	33	70	708	719·10	27·85
102	33	69	737	747·36	28·26
101	33	68	766	776·03	28·67
100	33	67	796	805·13	29·10
99	33	66	827	834·67	29·54
98	33	65	858	864·67	30·00
97	33	64	889	895·14	30·47
96	33	63	920	926·09	30·95
95	33	62	953	957·54	31·45
94	33	61	985	989·51	31·97
93	33	60	1017	1022·01	32·50
92	33	59	1050	1055·66	33·05
91	33	58	1084	1088·68	33·62
90	33	57	1118	1122·89	34·21
89°	33°	56°	1152	1157·71	34·82
88	33	55	1188	1193·16	35·45
87	33	54	1220	1229·27	36·11
86	33	53	1257	1266·06	36·79
85	33	52	1294	1303·56	37·50
84	33	51	1331	1341·79	38·23
83	33	50	1371	1380·79	39·00
82	33	49	1408	1420·59	39·80
81	33	48	1448	1461·22	40·63
80	33	47	1489	1502·71	41·49
79	33	46	1530	1545·10	42·39
78	33	45	1572	1588·43	43·33
77	33	44	1615	1632·75	44·32
76	33	43	1659	1678·10	45·35
75	33	42	1704	1724·53	46·43
74	33	41	1751	1772·09	47·56
73	33	40	1802	1820·84	48·75
72	33	39	1852	1870·84	50·00
71	33	38	1904	1922·16	51·32
70	33	37	1958	1974·86	52·70
69	33	36	2015	2029·02	54·16
68	33	35	2070	2084·73	55·71
67	33	34	2128	2142·08	57·35
66	33	33	2188	2201·17	59·09
65	33	32	2250	2262·11	60·94
64	33	31	2313	2325·01	62·90
63	33	30	2379	2390·01	65·00
62	33	29	2448	2457·25	67·24
61	33	28	2520	2526·89	69·64
60	33	27	2595	2599·11	72·22
59	33	26	2674	2674·11	75·00
58	33	25	2754	2752·11	78·00
57	33	24	2839	2833·36	81·25
56	33	23	2929	2918·14	84·78
55	33	22	3025	3006·78	88·64
54	33	21	3126	3099·64	92·86
53	33	20	3232	3197·14	97·50
52	33	19	3343	3299·77	102·63
51	33	18	3459	3408·10	108·33
50	33	17	3581	3522·80	114·70
49	33	16	3715	3644·67	121·87
48	33	15	3859	3774·67	130·00
47	33	14	4015	3913·95	139·28
46	33	13	4185	4063·95	150·00
45	33	12	4370	4226·45	162·50
44	33	11	4571	4398·73	177·28
43	33	10	4792	4593·73	195·00

J. ERICSSON

[WE have received a communication by cable from the author, to the effect that the engraver has indicated, in Fig. 2, a continuous space between the curves *a b* and *a c*, whereas the space should cease at one portion, the curves intersecting each other between the ordinates 25 and 30. The mistake is so trifling that it can scarcely be observed with the naked eye, yet it will no doubt be detected by such men as Stewart, Maxwell, and Everett. It is to be found, on looking at the table, that the observed times are shorter than the calculated times at the high temperatures, while the observed times are longer than the calculated times at low temperatures; hence the curves must intersect each other.—ED.]

NOTES

THE *Pall Mall Gazette* states that the Earl of Portsmouth, who is the collateral representative of Sir Isaac Newton, has offered to the University of Cambridge, through the Duke of Devonshire (Chancellor of the University), all the papers of Sir

Isaac relating to scientific subjects which his lordship has inherited. Lord Portsmouth's gift is prompted by the feeling that these papers will be more fitly deposited in the library of the University of which Sir Isaac was so distinguished an ornament than in his own muniment-room.

THE visitation of the Royal Observatory took place on Saturday last. We have not yet received the Astronomer Royal's report; but there is a rumour that it will be proposed to the Government by the Board of Visitors that photographic and spectroscopic observations of the sun be added to the routine work of the Observatory.

IT has been decided that the first Meeting of the French Association for the Advancement of Science shall be held at Bordeaux in the autumn of the present year.

THE Prince of Wales will open the Bethnal Green Museum on Monday, the 24th inst. The Princess of Wales will accompany him. We should be glad to hear of free Scientific Lectures in connection with this Museum.

WE are glad to learn that the Royal Geographical Society are taking steps to press upon Government the importance of an expedition to the North Pole by way of Smith's Sound.

IN another column will be found a correspondence between the Chancellor of the Exchequer and Profs. Roscoe and Balfour Stewart with reference to the remarks made by the former at the presentation to degrees at the University of London, to which we drew attention a fortnight ago. It is with great satisfaction that we note Mr. Lowe's own version of his speech, on which we may say a word, although the accuracy of Mr. Lowe's defence has been called in question by Prof. Sylvester. If he and the Government which he represents remain firm to their avowed declaration in favour of the endowment of the higher professorships, the cause of scientific education will have reason to be grateful, the Professor being distinguished from the teacher by the presence of *investigation*, as well as of inculcation. The *Pall Mall Gazette* called attention in a forcible manner last week to the fallacies of the line of argument which Mr. Lowe was represented to have employed. To encourage a plethora of scholarships at the expense of the endowment of professorships would be a more perfect illustration of the maxim "How not to do it," than we have witnessed this long time.

THE proposed alterations in the examinations held during the first two years of a student's course in the University of Cambridge were submitted on May 30 to the Senate with varying success. The vote was taken on the principle, and not on the details, of the various propositions. The most important of those accepted were—to receive a knowledge of French and German as a substitute for Greek in the first or "Previous" Examination; and to add Heat as a subject in the "General" or Second Examination for the Ordinary Degree. The effect of these changes, when finally ratified, will be that a degree in Honours, in either Mathematics, Law, Natural or Moral Science may be obtained by a student who does not know Greek; but that an ordinary "Poll" or Pass Degree cannot be obtained without a knowledge of Greek. Also, a candidate for a degree in Honours will not be required to study (necessarily) any branch of Physical Science; but a candidate for a "Poll" Degree must have an elementary knowledge of Heat. As, however, several persons, in the debate which preceded the voting upon these questions, expressed themselves favourable to making some branch of Natural or Physical Science a part of the Previous Examination, it is, we conceive, not improbable that the Syndicate will embody some proposition of this kind in their amended scheme.

THE following arrangements are now made for the forty-second meeting of the British Association for the Advancement of Science, to be held at Brighton, and to commence Wednesday, August 14, under the direction of the following officers:—President—Dr. William B. Carpenter, F.R.S. Vice-Presidents—The Earl of Chichester, the Duke of Norfolk, the Duke of Richmond, K.G., the Duke of Devonshire, K.G., F.R.S., Sir John Lubbock, Bart., M.P., F.R.S., Dr. Sharpey, LL.D., Sec. R.S., Mr. Joseph Prestwich, F.R.S. General Secretaries—Dr. Thomas Thomson, F.R.S., Capt. Douglas Galton, C.B., F.R.S. Assistant General Secretary—Mr. George Griffith. Local Secretaries for the Meeting at Brighton—Mr. Charles Carpenter, Rev. Dr. Griffith, Mr. Henry Willett, the Pavilion, Brighton. Local Treasurer for the Meeting at Brighton—Mr. William H. Hallett, F.L.S. General Treasurer—Mr. William Spottiswoode, F.R.S. The General Committee will meet on Wednesday, August 14, at 1 P.M., for the election of Sectional Officers, and the despatch of business usually brought before that body. On this occasion there will be presented the Report of the Council, embodying their proceedings during the past year. The General Committee will meet again on Monday, August 19, at 3 P.M., for the purpose of appointing Officers for 1873, and of deciding on the place of meeting in 1874. The concluding meeting of this Committee will be held on Wednesday, August 21, at 1 P.M., when the Report of the Committee of Recommendations will be received. The first general meeting will be held on Wednesday, August 14, at 8 P.M., when the President will deliver an address; the concluding meeting on Wednesday, August 21, at 2·30 P.M., when the Association will be adjourned to its next place of meeting. The different Sections will assemble in the rooms appointed for them, for the reading and discussion of Reports and other communications, on Thursday, August 15, Friday, August 16, Saturday, August 17, Monday, August 19, and Tuesday, August 20, at 11 A.M. precisely. Authors are reminded that, under an arrangement dated from 1871, the acceptance of Memoirs, and the days on which they are to be read, are now, as far as possible, determined by Organising Committees for the several Sections before the beginning of the meeting.

PROFESSOR RUTHERFORD, of King's College, London, has been appointed Fullerian Professor of Physiology to the Royal Institution, in the place of Dr. M. Foster.

THE *British Medical Journal* gives currency to a report that a baronetcy is about to be conferred on Dr. William Stokes, Regius Professor of Physic in Trinity College, Dublin, and Physician to the Queen in Ireland.

WE have to record the death of one of our veteran botanists, Dr. Robert Wight, F.R.S., who died May 26, at his residence, Grazeley Lodge, near Reading, at the age of 76. Dr. Wight was a native of East Lothian, and very early in life entered the medical service of the East India Company, and while in this employment devoted his energies to the investigation of the then almost unknown flora of the British possessions in India. In 1834 he published, in conjunction with the late Prof. Arnott, the first volume of the "Prodromus Floræ Indiæ Orientalis," a work which was never continued. Further contributions to Indian botany were contained in his "Illustrations of Indian Botany," "Icones Plantarum Indiæ Orientalis," and "Spicilegium Neilgherrense," and in innumerable contributions to magazines and to the proceedings of societies. His name will also always be associated with his exertions towards the introduction of the cultivation of cotton into India. Dr. Wight was one of a band of botanists, to which Sir W. Hooker, Lindley, and Arnott belonged, who have now almost entirely passed away.

MR. JOHN B. LAWES, of Rothamsted, Herts, has announced his intention of placing in trust his laboratory and experimental fields with the sum of 100,000*l.*, the interest of which, after his death, is to be applied to the continuation of the investigations which have been carried on for so many years at Rothamsted. It is seldom that we have to record an act of so great munificence directed in a channel calculated to bring about such important results to the scientific department of agriculture.

PROF. WATSON, the indefatigable planet hunter of the Ann Arbor Observatory, reports the discovery, on May 12, 1872, of a new asteroid (No. 121) of the eleventh magnitude. The following observations are communicated by him to *Harper's Weekly* :—

Ann Arbor.	Mean Time.	Right Ascension.	Declination.
May 12	$14^h\ 13^m\ 42^s$	$16^h\ 20^m\ 37{\cdot}58^s$	$-18°\ 53'\ 9{\cdot}4''$
,, 13	$11^h\ 13^m\ 22^s$	$16^h\ 19^m\ 59{\cdot}35^s$	$-18°\ 52'\ 46{\cdot}2''$

Daily motion in right ascension, -43^s; in declination, $+26''$.

PROF. FLOWER'S lectures on the Comparative Anatomy of the Organs of Digestion of the Mammalia lately delivered at the Royal College of Surgeons of England are being published with illustrations in the *Medical Times and Gazette.*

THE last Swiney lecture of the present year will be delivered on Saturday next, when the general subject of Science in relation to Education will be considered. This will terminate Dr. Cobbold's tenure of the Chair, which is only open to medical graduates of the Edinburgh University. The collective attendances for this series of sixty discourses will, we understand, have registered a total of upwards of 15,000, a result which is gratifying to the friends of popular scientific instruction.

MR. CARRUTHERS has printed his Official Report for 1871 of the Department of Botany in the British Museum. In consequence of the extent of the recent additions to the general herbarium, additional cabinets have had to be incorporated, and the old ones rearranged. The exhibition rooms have also been rearranged, with a view of making them more instructive and attractive to visitors. Several natural orders in the General and British Herbaria have been rearranged. Among the more important additions to the General Herbarium are 17,000 species, chiefly from Central Europe, Alsace, the Jura, the Lower Rhine, Spain, Mexico, and Labrador, being the herbarium of Auerswald, of Leipzig; 1,000 from Yucatan, collected by Dr. A. Schott; upwards of 1,000 from Russia; and upwards of 1,500 from Scandinavia, collected by Ahlberg.

IN a letter from General Otto Struve, director of the Palkowa Observatory, and Astronomer Royal of Russia, to Prof. Newcomb, of the Washington Observatory, detailing the Russian preparations for observing the forthcoming transit of Venus, and printed in *Harper's Weekly*, he remarks that the inquiries into the meteorological conditions of the stations selected have given, on the whole, very satisfactory results, particularly for the station on the coast of the Pacific Ocean and in Eastern Siberia (85 per cent. of clear sky for December). In two only of the stations chosen, Taschkent and Astrabad, these conditions are not sufficiently satisfactory. For this reason the observers designed for Taschkent will probably go to a place about 100 miles west of that town; and instead of Astrabad it is proposed to take either the island of Aschuradeh, in the Caspian Sea, or, if possible, to cross the Elburz Mountains, and establish observers at Schahrech, in Persia (with nearly absolute certainty of clear sky). The total number of Russian stations will be twenty-four, each of them provided with only one instrument for the transit observation. These instruments are—three 4-inch heliometers, three photo-heliographs, four 6-inch equatorials, and four 4-inch equatorials, provided with filar micrometers and spectroscopic apparatus, and ten 4-inch telescopes, designed merely for contact observations. Each station will also be furnished with clocks, chronometers, and the instruments necessary for exact determination of time. The principal instruments have already been ordered. Most of them will be ready for use in the course of the present or beginning of next year. For these instruments the observers are also in a great part already selected. They will all visit Palkowa for a certain time in 1873 to exercise themselves in the observations. The geographical positions of the stations will not be determined by the transit observers; but all stations on which the transit has been successfully observed will be carefully determined afterwards by special expeditions of the general staff or the navy. For this purpose a principal line of telegraphic longitudes will probably be laid next year through all Siberia to Nicolajevsk, with which line the other stations of that part of Russia can easily be joined, either by telegraphic or chronometric operations. With regard to photographic observations, Prof. Struve states that two observers, one at Vilna, and Dr. Vogel at Bothkamp, in Holstein, have been perfectly successful in taking instantaneous observations with dry plates.

THE Cambridge Natural Science Club has just issued its first terminal report. The club was founded March 11, 1872, by some of the undergraduates and B.A. members of the university for (Rule 1) "The promotion of natural science by means of friendly intercourse and mutual instruction." The number of members was at first limited to nine, but at the third meeting the number increased to twelve. The number is limited in order that the meetings may be held in the rooms of the members. Meetings are held every Saturday evening during term, and during eight weeks of the long vacation, in the rooms of the members in rotation. The member in whose rooms the meeting is held is president for the evening, and (Rule 7) "brings some subject of scientific interest under the consideration of the members in the form of a short paper, with such practical illustrations as the subject admits of." The papers read during this term have been the following:—By Mr. J. C. Saunders, B.A. (Downing College), "On Conspicuous Movements in Plants;" Mr. C. T. Whitwell, B.A., B.Sc. (London), Trinity, "On Isothermals;" Mr. C. J. F. Yule (St. John's), "On the Anatomy of Pyrosoma;" Mr. H. M. Martin, M.B., B.Sc. (London) Christ's, "On the Modes of Reproduction of Animals and Plants;" Mr. A. Liversedge (Christ's) "On Supersaturated Saline Solutions;" Mr. J. E. H. Gordon (Caius), "On Submarine Telegraphy;" Mr. P. H. Carpenter (Trinity), "On the History of the Abbeville Jaw."

A BOTANICAL and geological excursion class has been commenced in connection with the St. Thomas's Church Schools Birmingham. President, Rev. T. D. Halstead, rector; secretary, Mr. Miller (brother of the late celebrated chemist); conductor, Mr. John Turner, F.M.S. The class consists of twenty-five members, most of whom have attended science classes during the winter, and recently competed in the examinations of the Science and Art Department. The class meets every Saturday afternoon.

WE learn from the *British Medical Journal* that a committee, consisting of Profs. Bamberger, Billroth, Brücke, Duchek, and Schroff, has been appointed to select candidates to be invited to fill the chair of Pathological Chemistry at the University of Vienna. The names of Hoppe-Seyler (lately appointed to the University of Strasburg), Kühne (of Heidelberg), and Liebreich (of Berlin), are mentioned in connection with the post. The establishment of a professorship of Hygiene in the University is under discussion; and there appears to be a general agreement among the professors in the University as to the necessity of having such a chair instituted with as little delay as possible.

A FAIRLY perfect human skeleton has been discovered by Dr. Revière in the caverns of Baoussé-Roussé, near Menton, on March 26, and a short paper on this interesting find was read to the Academy of Sciences at a recent sitting.